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(54) **Aqueous chemical mechanical polishing dispersion composition, wafer surface polishing process and manufacturing process of a semiconductor device**

(57) It is an object of the present invention to provide an aqueous dispersion and CMP slurry that can achieve polishing at an adequate rate without producing scratches in the polishing surfaces of wafer working films, and a polishing process for wafer surfaces and a process for manufacture of a semiconductor device using them. A CMP slurry and the like of the present invention contains polymer particles with a crosslinked structure and a mean particle size of 0.13-0.8  $\mu\text{m}$ . The CMP slurry may contain no surfactant, and may contain the surfactant of not greater than 0.15 wt%. A CMP slurry and the like of another present invention contains polymer particles

and inorganic particles of silica, aluminum and the like. a mean particle size of the polymer particles may be not greater than a mean particle size of the inorganic particles. And the mean particle size of the inorganic coagulated particles may be 0.1-1.0  $\mu\text{m}$ , and may be smaller than the mean particle size of the polymer particles. The CMP slurry is used as a polishing agent and a working film of a silicon oxide film, an aluminum film, a tungsten film or a copper film formed on a wafer is polished. And a semiconductor device is manufactured by using the CMP slurry.

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## EUROPEAN SEARCH REPORT

Application Number  
EP 00 10 0910

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (Int.Cl.7)
E	EP 1 077 240 A (JSR CORP) 21 February 2001 (2001-02-21)  * page 3, line 25-36 * * abstract * * paragraphs '0045!', '0046!', '0052!'; claims *	1-7, 9, 11-20, 25, 30-35, 38-41, 43-46	C09G1/02 C09K3/14 H01L21/321 C09D17/00
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X	--- US 5 705 559 A (ISHIKURA SHINICHI ET AL) 6 January 1998 (1998-01-06) * claims 1, 6 *	1, 11	TECHNICAL FIELDS SEARCHED (Int.Cl.7)  C09G C09K H01L C09D
X	--- US 5 326 381 A (ENGELHARD CORP.) 5 July 1994 (1994-07-05) * abstract * * column 3, line 22-64 *	7, 8	
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The present search report has been drawn up for all claims			
Place of search <b>THE HAGUE</b>		Date of completion of the search <b>5 November 2003</b>	Examiner <b>Girard, Y</b>
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons ..... & : member of the same patent family, corresponding document	

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Application Number  
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**CLAIMS INCURRING FEES**

The present European patent application comprised at the time of filing more than ten claims.

- ☐ Only part of the claims have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims and for those claims for which claims fees have been paid, namely claim(s):
- ☐ No claims fees have been paid within the prescribed time limit. The present European search report has been drawn up for the first ten claims.

**LACK OF UNITY OF INVENTION**

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

see sheet B

- ☒ All further search fees have been paid within the fixed time limit. The present European search report has been drawn up for all claims.
- ☐ As all searchable claims could be searched without effort justifying an additional fee, the Search Division did not invite payment of any additional fee.
- ☐ Only part of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the inventions in respect of which search fees have been paid, namely claims:
- ☐ None of the further search fees have been paid within the fixed time limit. The present European search report has been drawn up for those parts of the European patent application which relate to the invention first mentioned in the claims, namely claims:



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LACK OF UNITY OF INVENTION  
SHEET B

Application Number  
EP 00 10 0910

The Search Division considers that the present European patent application does not comply with the requirements of unity of invention and relates to several inventions or groups of inventions, namely:

1. Claims: 1-6, 11-18, 30-37, 43, 44

Aqueous dispersion of crosslinked polymer particles having a mean particle size as specified, polishing of wafers and manufacture of semiconductor device by using the same.

2. Claims: 7-10, 19-29, 38-42, 45 46

Aqueous dispersion containing polymer particles and inorganic particles, polishing of wafers and manufacture of semiconductor device by using the same.

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ANNEX TO THE EUROPEAN SEARCH REPORT  
ON EUROPEAN PATENT APPLICATION NO.

EP 00 10 0910

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on  
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05-11-2003

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